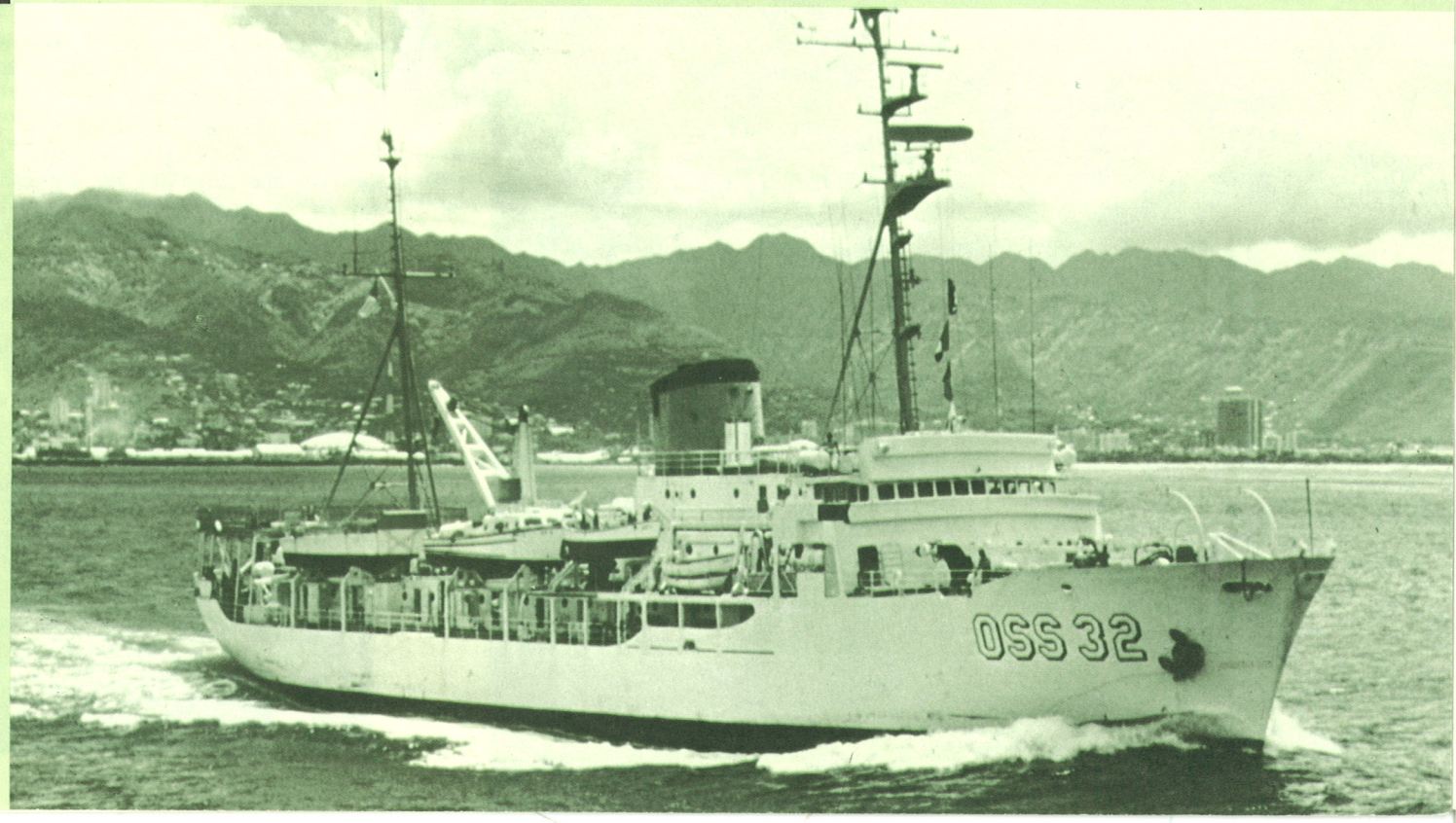
A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

Welcome Aboard!

# USC&GSS Surveyor OSS 32




UNITED STATES DEPARTMENT OF COMMERCE

ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION


# Welcome Aboard!

A message from the Captain:

On behalf of the officers and men of the USC&GSS *Surveyor,* I welcome you aboard. I hope your visit will be both enlightening and enjoyable.

The marine environment is one of man's most challenging frontiers, and the *Surveyor* and ships like her are leading the way in the exploration of this underwater world. I hope you will leave our ship with a greater appreciation for, and knowledge of, the science and technology that help us understand the world's oceans.

The officers and crew of the *Surveyor* are at your disposal and will gladly answer any questions concerning the ship and her activities.

Commanding Officer
USC&GSS *Surveyor*

The USC&GSS *Surveyor* is one of a fleet of oceanographic survey vessels operated by ESSA, the Environmental Science Services Administration, to expand man's understanding and uses of his physical environment. Designated Ocean Survey Ship (OSS) 32, the *Surveyor* is commanded by officers of the ESSA Commissioned Corps and run by the Coast and Geodetic Survey, an ESSA component.

The *Surveyor* is an ocean survey ship designed for combined operations in the oceanic basins, over the Continental Shelf, and in estuarine waters. A Class I survey ship, she is 292 feet, 2 inches long, has a 46-foot beam, and has a loaded displacement of 3,230 long tons. The *Surveyor* can steam over halfway around the world at a cruising speed of 15 knots. She is powered by steam turbines, driving a single screw with a maximum of 3,520 shaft horsepower. A 200-hp retractable stern-mounted auxiliary power unit, similar to an outboard motor, aids maneuvering.

The *Surveyor* can be provisioned for 4½ months while working in remote areas and has a steaming endurance of 35 days. Enclosed areas on board are air conditioned for crew comfort and efficiency while working in extreme latitudes. Facilities include extensive drafting and plotting areas for survey work, a photo lab, a print shop, a small oceanographic laboratory, and carpenter, machine, and electronic shops to maintain systems aboard and to aid in the construction of installations ashore. The *Surveyor* has a modest medical department which can perform quite well when necessary—a successful emergency appendectomy was performed on a crewman in 1964.

A versatile ocean survey vessel, the *Surveyor* can handle a wide variety of survey, geophysical, and oceanographic operations. While underway the ship can simultaneously measure depth, magnetic field intensity, and gravitational attraction, and produce a sub-bottom geologic profile.

To provide accurate, continuous depth records in both shallow and deep water the ship carries six echo-sounders. One of these is an electronically stabilized narrow-beam sounder. The narrow-beam system uses two glass fiber streamlined transducer domes located amidships on the underwater hull; one dome contains an array of transmitters oriented longitudinally, the other an array of receivers oriented laterally. A vertical reference gyro and associated servo system activates the transmitters so that the signal is always directed vertically, regardless of the roll and pitch of the ship. This means the *Surveyor* can run a high-accuracy depth profile even in heavy seas.

The ship measures magnetic field intensity by means of a proton precession sensor towed behind the ship that feeds into a digital and analog recorder system. Gravitational field strength is measured underway by a device which separates the ship's motion from the actual gravity field.

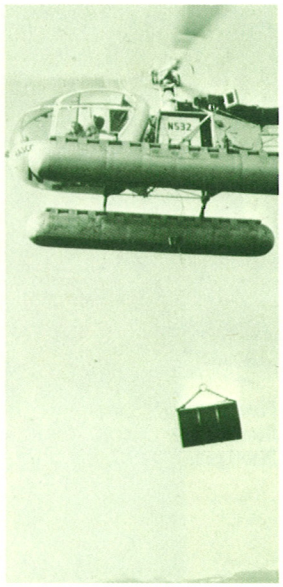
The ship's geographic position at sea can be established with a high degree of accuracy. For deep-sea navigation, the *Surveyor* uses the Satellite Navigation System with worldwide capabilities, plus Loran-A and Loran-C where such coverage is available. Celestial navigation supplements other methods when necessary.

For precise positioning of offshore surveys, several electronic position-fixing systems such as Raydist and Hi-Fix are available. To operate these, the ship builds and mans stations ashore.

A gyrocompass with several repeaters is an integral part of the navigation system and is used with the automatic gyro pilot when running a trackline. A magnetic compass is available if the gyrocompass fails. The ship carries two radars. Her communications systems cover intermediate through high frequencies, with very high frequency systems available for ship-auxiliary launch communications.

These auxiliary boats include two 36-foot landing craft (LCVP), two 36-foot survey launches, two 26-foot motor whaleboats, and several smaller outboard boats. The survey launches carry shoal-water echo-sounders and can be deployed for inshore hydrography while the *Surveyor* is engaged in surveys offshore. The LCVP's are used to transport equipment and personnel. The helicopter pad on the *Surveyor's* after deck makes her unique among her C&GS sisters. Use of helicopters greatly enhances the efficiency of ship-to-shore transportation. When a helicopter is not part of operations, a portable balloon inflation shelter can be erected on the pad for radiosonde observations.

The *Surveyor* has good oceanographic capabilities. She can occupy standard oceanographic stations using the STD



***Left:*** **A Clark Jet Net plankton sampler is cleaned after use.**

***Center:*** **One of the *Surveyor's* LCVP's takes shallow-water bottom samples.**

***Right:*** **A helicopter lifts off from the *Surveyor's* landing pad.**

In file ↑

(salinity-temperature-depth) unit, Nansen bottles, corers, bottom samplers, or other sensors as needed. The ship also can take dredge samples. Portable tide gages are carried and used to establish a tidal datum reference for correction of soundings during hydrographic surveys. Meteorological surface and upper-air measurements are made on the synoptic schedule.

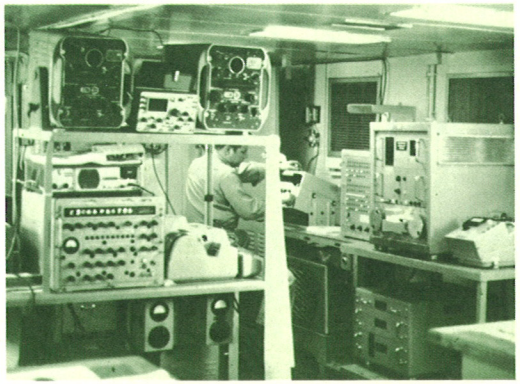
Special equipment used by the ship includes the seismic reflection profiler, which produces a cross-section of the sub-bottom geologic structure; the thermoprobe, which indirectly measures heat flow from the earth's crust into the lower levels of the ocean; the geomagnetic electrokinetograph (GEK), which measures surface currents by sensing lateral drift of the ship with respect to the earth's fixed magnetic field; surface and sub-surface current sensing devices; and instruments to measure incident solar radiation and light transmissivity.

To aid in oceanographic and survey operations a variety of winches, booms, and cranes are available. Bathythermograph winches are located port and starboard on the bridge deck, and an exchangeable-reel Jared hydrographic winch containing 10,000 feet of 6-conductor electrical cable is on the stern. The oceanographic winch on the starboard superstructure deck has a capacity of 10,000 meters of 5/32-inch stainless steel wire. The deep-sea winch, which is powered by a 30,000-pound pull traction unit, has a capacity of 45,000 feet of tapered wire rope. Two separate reels aft contain 750 feet of heavy-duty magnetic sensor towing cable with sensors attached. A 10-ton crane is located on the superstructure deck, and two 2½-ton cranes are on the forecastle deck. Various other frames and booms are available for use in different oceanographic operations.

Although a good portion of *Surveyor's* work has been in the development and revision of nautical charts, much of her work utilizes her oceanographic capabilities. She has played important roles in ocean survey programs, geophysical experiments, and in the production of the Coast and Geodetic Survey's bathymetric map series which shows the seafloor's topography. Part of this series owes its existence largely to the *Surveyor*. A bathymetric map with geomagnetic and gravity overlays, the first of its kind ever developed for a broad area, was compiled from *Surveyor* and *Oceanographer* field work in the northern Bering Sea-Norton Sound area of Alaska, where the hunt is on for heavy metals and other Continental Shelf resources. Other important assignments have included post-earthquake reconnaisance surveys in Alaska, seismic reflection experiments in the Bering Sea, participation in such international projects as the Line Island Experiment, and seasonal work in the important SEAMAP ocean survey program in the Pacific.

To those who have served aboard the USC&GSS *Surveyor,* the ship is both a great favorite and a fleet workhorse. The *Surveyor's* keel was laid March 22, 1958, the ship was launched April 25, 1959, and she was commissioned April 30, 1960. She is both the first of the new generation and the last of the old. Her home port is the Coast and Geodetic Survey's Pacific Marine Center, Seattle, Washington. Her working grounds span the Pacific—in 1968 alone, the ship covered more than 46,600 nautical miles of survey trackline and occupied more than 160 oceanographic stations. She wears the workhorse halter very comfortably.

The first *Surveyor* was a 1,000-ton-displacement, 186-foot steel steamer launched into Lake Michigan from Manitowok, Wisconsin, on July 22, 1916, commissioned October 1, 1917, and employed for 33 years until her decommissioning on December 30, 1950. Like her modern successor, that *Surveyor* worked in the Pacific.



**Navigation equipment in the after portion of *Surveyor's* chart room includes the Satellite Navigator at right.** in file ↑

## General Description

| | | |
|---|---|---|
| Length, overall | 292 | feet 2 inches |
| Beam | 46 | feet |
| Draft, fully loaded | 18 | feet 6 inches |
| Displacement, fully loaded | 3,230 | long tons |
| Cruising speed | 15 | knots |
| Range | 12,600 | nautical miles |
| Endurance | 35 | days |
| Complement* | 14 | officers |
| | 76 | crew |

*Accommodations for 8 visiting scientists

in file ↓

***Left:* *Surveyor's* meteorologist records data transmitted by a balloon-borne instrument package.**

***Right:* The Satellite Navigator antenna system gets a check out.**

IN FILE ↑

# Oceanography at ESSA

A Raydist calibration buoy is placed in Norton Sound, Alaska.

IN FILE ↑

The Coast and Geodetic Survey, the Atlantic Oceanographic and Meteorological Laboratories and the Pacific Oceanographic Laboratories are the principal oceanographic elements of ESSA. The interplay between them is readily apparent. The Coast and Geodetic Survey's systematic ocean surveys produce oceanographic, geophysical, and geological data of interest to the Laboratories' programs; and the improved understanding of the marine environment developed from research has its impact on the conduct of systematic surveys.

The data-collection platforms behind ESSA's marine description and prediction programs are the ships of the Coast and Geodetic Survey fleet, ranging in size from the 303-foot, 3,800-ton *Oceanographer* and *Discoverer,* down to the small pair of wire-drag specialists, *Rude* and *Heck*.

The Atlantic Oceanographic and Meteorological Laboratories are headquartered in Miami, Florida, and include the Atlantic Oceanographic Laboratories and the National Hurricane Research Laboratory. The Pacific Oceanographic Laboratories are with the Coast Survey's Pacific Marine Center in Seattle, Washington. The Laboratories include small, specialized research groups such as the Joint Tsunami Research Effort, at the University of Hawaii, and the Joint Oceanographic Research Group, at the University of Washington. The objective here has been to foster productive environmental research, both as a federal sponsor and as a member of the academic community.

The USC&GSS *Surveyor* is important to both the service and research aspects of ESSA's marine environmental programs. The ship's hydrographic surveys improve the safety of coastal commerce, harbor operations, and recreational craft. Her part in developing detailed bathymetry of the Continental Shelf regions is helping man tap these undersea reserves. Her central role in the Pacific ocean survey program expanded man's knowledge of the structure and dynamics of the ocean and its basin.

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